UNDERSTANDING THE SAFETY CULTURE: A COMMUNICATIONAL APPROACH TO "BLAME" OPTIONS IN ASRS INCIDENT REPORT NARRATIVES

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ABSTRACT

This study explores the purpose and impact of blame in high-risk human systems from a communication perspective. In 200 narratives, 50 each from the four types of Aviation Safety Reporting System incident reports (flight crew, cabin crew, aviation maintenance technicians and air traffic controllers) the focus is on an empirical exploration of blame options utilized. Taxonomies of blame options are developed and compared across report types. Blame is explored not as an indicator of individual culpability but as an indicator of systemic issues within and across work domains to be addressed in the development of a safety culture.

INTRODUCTION

In the contemporary world of complex organizations with increasingly global impact - aviation, space exploration, healthcare, energy, and defense - the concept of blame is of concern whenever systems breakdown and an error, incident or accident occurs. The assignment of blame is often central to media coverage of accidents and a byproduct of investigative report findings. Frequently human error is the locus of blame. The desire to blame people for errors, rather than situations or the larger organizational system arises, as James Reason (1997) points out, from the particularly Western belief in the illusionary concept of free will. This belief is grounded in the assumption that humans are able to choose between correct and error-prone paths and thus errors are seen as voluntary and culpable actions. However, the study of human error, and indeed our own day to day experience, leads to the recognition that (unintended) accidents will happen. Human error cannot be eliminated and organizations must provide redundancies in design, procedures, and environmental supports that safeguard humans, both employees and publics, as far as possible from the dangers and risk inherent in complex systems.

Recent discussions of industrial accidents propose a systems approach to organizational safety and the need for organizations to move toward a safety culture. Maurino, Reason, Johnston & Lee (1995), for example, propose a model of safety assessment, study and management that strives to go beyond individual human error toward a focus on systemic, organizational, cultural issues. Communication is commonly suggested as both source and solution to human error. Nevertheless, the ways in which the discipline of communication may contribute to a safety culture have yet to be fully elaborated. In this paper we provide a brief overview of the theoretical and methodological foundation for a communicational approach to human factors research. We demonstrate the utility of this approach to the concept of a safety culture by examining blame -- seeking not a final singular location for blame but its range of possible locations in differing worlds of aviation work. We examine a small sample of incident report narratives from the Aviation Safety Reporting System database and propose an initial taxonomy for the ways in which blame can be assigned by authors from four different domains of work: flight crew, cabin crew, ground crew and air traffic control. The taxonomy includes blame directed toward persons, places and things as assigned by narrators. This taxonomy, further refined, might then be utilized to map and track blame options in different domains within large organizational systems.

We begin with a brief discussion of how a communicational approach contributes to the elaboration of the concept of a safety culture. The focus then moves to a methodological approach appropriate to this perspective. The study is grounded in naturalistic inquiry utilizing incident participant narratives to develop an initial taxonomy of blame options in related work domains.

A COMMUNICATIONAL APPROACH TO THE SAFETY CULTURE

James Reason (1997) identifies the illusionary concept of free will as problematic in addressing human error. This belief is consistent with a commonly held Cartesian assumption of an autonomous, rational individual -- one who can choose to be error-free. In the discipline of communication this approach is best described as informational. An informational perspective on communication understands humans in the dominant psychological and Cartesian sense -- as autonomous, primarily cognitive beings coming to know the world primarily through linear, rational thought. In this view language is an

external system used as a referential tool that labels and captures the surrounding objective reality. Language is viewed as unproblematic and allows for the expression of an individual, internal subjective reality. The familiar binary opposition of objectivity and subjectivity, external and internal reality, individual and world are fundamental assumptions in an informational and essentially psychological perspective, which dominates the social sciences.

In contrast, a communicational or constitutive approach depends upon the assumption of humans as relational, semiotic beings (Mokros & Deetz 1996). This approach traces its foundations in philosophy to Heidegger rather than Descartes and its semiotic foundations to Sapir, Peirce and to the linguistics of Jakobson. Communication is understood as more than a referential tool to an external reality, it instead is understood as providing both the structure and strategies of everyday human interaction (Duncan, Fiske, Denny, Kanki, & Mokros, 1985). Jakobson (1990) offers a model of communication that includes multiple levels from phonemic to cultural. A brief examination of this model (Figure 1) provides a foundation for a communicational approach to the safety culture.

Jakobson's model for the study of communication, includes multiple embedded levels, recognizing a continual movement from parts to wholes, from the more narrow frame of phonemic components to the broader social perspective (1990, p. 20). In the center of his model, he placed poetics, the study of the interplay of sound and meaning, the poetic aspect of all messages. In human factors research this might translate into the study of voice stress analysis or the design of warning systems. The study of poetics is then embedded in linguistics, the study of talk; that is, communication (as a process) of any verbal message such as read back/hear back or command/acknowledgement interactions. Linguistics, for Jakobson involved a moving back and forth between language as a symbol system with a grammar and syntax, and speaking as social activity. This understanding of linguistics was then embedded in the broader circle of semiotics, the study of all systems of signs or meaning, including language. Aviation creates many unique systems of meaning: standard operating procedures such as checklists, and callouts, acronyms, data displays, air traffic control phraseology. Finally, in Jakobson's model, these levels of communication are also always embedded in and in turn draw upon the larger framework of social anthropology, the study of culture including the law, politics, history, geography and economics.

The communicational perspective taken here examines interaction and the artifacts of interaction (narrative texts) on multiple levels to understand the
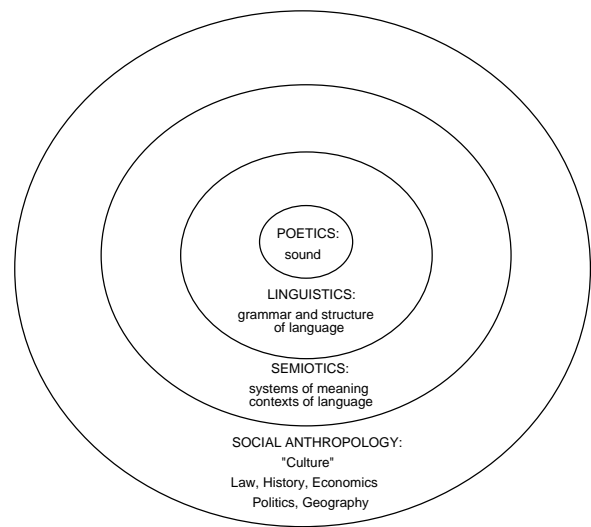

Figure 1 Jakobson's model of the various levels and relations between communication sciences.

ways in which meaning is proposed and contingently achieved between persons, within organizations and within societies. In this examination of narratives, one focus is on the linguistic level as word counts and vocabulary choices guide the development of taxonomies. In addition, the semiotic levels of aviation and of the larger social culture are addressed as they serve to enable or constrain blame options.

The Safety Culture and "Blame"

The realm of communication study moves between the more intimate levels of talk and the broader levels of social anthropology to address the study of culture. The renowned anthropologist Clifford Geertz (1973) provides a communicational or semiotic understanding of culture. "Believing with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it…an interpretive one in search of meaning." (p.5). Thus the study of an organization's culture, while always embedded within larger social cultures, is a semiotic one. Organizational culture is to be understood through ethnography, the multi-layered description and systematic analysis of contextualized interaction and the byproducts of interaction, such as texts, in this case narratives.

Safety must also be examined before its implication for an organization's culture can be assessed. The organization's culture, its webs of significance, are

available as contracts and regulations, mission statements, policies, procedures, work instructions, training manuals and seminars, industrial design, meetings, and management styles. Each of these semiotic systems contributes to the meaning of safety within an organization. Blame may serve to highlight those situations where safety barriers have failed.

Reason points out that organizations frequently fall into nonproductive blame cycles. That is, since humans are assumed to be in control of all of their actions, when faced with error, industry management often issues individual sanctions and warnings for violations rather than investigate or analyze the situational aspects that contribute to the error. He suggests that the development of a safety culture depends on a workforce willing to voluntarily submit reports of errors and near misses. While a "no-blame culture is neither feasible nor desirable" (p.195), an organization must be willing to examine how it assigns blame and punishment in order to create the more positive "just culture" that is part of a safety culture.

David Marx (1998) also addresses the issue of blame and the creation of a just culture through the examination of regulatory and disciplinary actions related to blame. As Jakobson's model illustrates, ways of talking are constrained by larger cultural frameworks. In this study, narratives on incidents reveal ways in which participants in different domains are constrained in blaming options by conflicting understandings of the complex web of regulations, disciplinary policies and organizational goals Marx describes.

A no-blame culture cannot be achieved because error cannot be eliminated and blame serves a particular purpose, a moral function of defining what is dangerous or unacceptable within a social world. Anthropologist Mary Douglas (1992) has explored the concept of blame as a moral and cultural phenomenon in both "primitive" and contemporary cultures. She suggests that "blaming and the system of justice together are symptoms of the way the society is organized" (p.6). According to Douglas, "Danger is defined to protect the public good and the incidence of blame is a by-product of arrangements for persuading fellow members to contribute to it" (p.6). Blame can then be understood as a discursive move, within a range of possibilities, that describes what a community has determined (or is in the process of determining) is safe and what is a dangerous or blameworthy action or situation.

In this study we examine a small sample of narratives filed with the Aviation Safety Reporting

System to develop a taxonomy of blame options utilized in four differing work domains. The purpose of this taxonomy is to begin to elaborate the range and breadth of the moral terrain and to understand these discursive possibilities as providing one way to understand current perceptions of the safety culture within and across domains.

DESCRIPTION OF THE STUDY

The Aviation Safety Reporting System (ASRS) implemented in 1976 receives voluntarily submitted reports on aviation incidents from pilots, cabin crew, aircraft maintenance personnel and air traffic controllers. These reports describe unsafe occurrences and hazardous situations. The purpose of the ASRS program is two-fold: to identify deficiencies and discrepancies in the national aviation system and to provide data for research, particularly human factors research to improve that system. The program depends on the voluntary submission of reports and to that end assures confidentiality and limited immunity from the Federal Aviation Administration to individuals who report unintentional rule violations. The program began with a focus on pilots and air traffic controllers but in recent years has expanded to include other personnel in the aviation domain. The report forms vary slightly for the four different work groups: flight crew, cabin crew, air traffic control and maintenance. In general however, all forms ask for information on the reporter's background and experience, the type of equipment involved, the location, phase of flight, weather and visibility conditions at the time the incident occurred. In addition, all four types of reports ask for a narrative that describes the chain of events and the human factors considerations involved in the incident. The human factors suggested for consideration include judgements, perceptions, decisions, actions or lack of actions related to the incident and an assessment of the quality of human performance. The narratives are the focus of this study.

The Data

A search request of the ASRS database[1] for 50 randomly selected reports from the four different types of reports yielded the data used in this study. As the study is exploratory no specifications were made concerning types of anomalies reported or domains of aviation included, thus general aviation, cargo and air carrier reports are included within the initial data examined. It should be noted that these four domains do not contribute equally to the ASRS system. Reports

[1] Search requested June, 1999 and received July, 1999.

from pilots in GA, Air Taxi and Carriers represent 93% of reports submitted. ATC makes up 4% of reports submitted while Cabin and Ground Crew contribute 1% each. Different immunity issues are pertinent in each domain and the constraints of organizational culture may impact on the ways in which the system is utilized.

Methodology

The study examines the structure of narratives from the four report forms types available, representative of different types of personnel within the aviation system who are direct participants in and witnesses to incidents. Each report includes a narrative of an incident that provides an account of the event. The filing of a report is fundamentally a move to document an error/anomaly of some type and thus the potential for blame exists. The initial examination of the four types of reports focuses on an empirical exploration of the shape of the reports through word counts and the development of a taxonomy of blame options present within each report and by type of report. Word counts were done utilizing word processing tools. The taxonomy of blame options was developed after an examination and categorization of communicative moves in each narrative. The goal in developing a taxonomy of blame moves was to remain grounded in the empirical data; the taxonomy unfolded as the narratives were examined. The number of categories was not limited as the taxonomy developed although at the next level of analysis categories were combined. For example, the category of "Self Blame" within the report type Flight Crew was found to include four types: Forget, Fatigue, Slip and Distracted. Within this type, the category of Distracted was further found to include seven types of distraction sources: Equipment Problems, Airport Configuration, Weather, Air Traffic Control, Other Crew Members, Traffic, and Being Lost.

RESULTS

The broad taxonomies of blame options developed for the four types of reports are presented in Table 1 in descending order of usage. Narratives ranged from 0 - 1,082 words. (One report filed by a cabin crew member left the narrative portion of the form blank, demonstrating silence as one option and forgetting or overlooking as other possibilities) Flight crews and ground crews provided narratives with means close to the expected of 141 words. While the mean of cabin crew narratives might seem high at 161 words, this was largely due to the single longest narrative of 1,082 words and two other narratives of over 400 words in this domain. Air Traffic Controllers were consistently

brief in their narratives with a mean of 128 words and the shortest range of narrative length in the four work domains.

Work Domains	Flight Crew	Cabin Crew	Ground Crew	ATC	Total
Total Word Count	7,103	8,050	6,948	6274	28357 (Mean = 7093)
Word Count Mean	142	161	141	128	Expected Mean = 141
Word Count Range	30-370	0-1,082	19-359	16-334	
Option Range	1-4	1-5	1-6	1-4	
Blame Options:					
1. Self	40	3	36	20	99
2. Others	23	50	24	45	143
3. Workload	3	4	4	14	25
4. Equipment	17	15	8	14	54
5. Weather	2	7	0	3	12
6. Info Sources	6	0	21	2	28
7. Airport	2	0	0	5	7
Total Options	**93**	**79**	**93**	**103**	**368**

Table 1. Word Counts and Distribution of Blame Options in Seven Broad Categories from 50 ASRS Narratives in each of the Four Work Domains.

Taxonomy of Blame Options by Domain

The study also focuses on the development of taxonomies of blame (Tables 2-5) for each of the four work domains. The full range of options were identified first and these options were then collapsed to create the seven larger categories of Self, Other, Workload, Equipment, Weather, Information Sources and the Airport across all four domains. As Tables 2-5 demonstrate, each of the four domains revealed different possibilities within these larger categories. For example, the category of Self may be used to accept or avoid blame. In Flight Crew narratives, Self Blame options were all accepting of blame ("I forgot", "I was fatigued", "I was distracted"). In Cabin Crew narratives Self Blame could indicate acceptance or avoidance, or denial. Ground crew also utilized denial of blame and added the option of complacency in the Self Blame category. Air Traffic Controllers offered another type of Self Blame, "I was trying to accommodate others". Note that in this option, even though others are mentioned, blame is directed toward the self whereas in the category of Others, the blame is directed toward others. Thus blame options in each domain reveal the outline of a world of work and who or what it is possible to implicate in each world. Blame options are listed in descending order of usage within

each domain with subcategories indicated within brackets and counts for each option's use indicated within parentheses.

Blame Option Taxonomy in Four Domains of ASRS Report Narratives				
Blame Option	Flight Crew	Cabin Crew	Ground Crew	Air Traffic Control
Self	Distracted (19): [Equipment (6), Airport (4) Weather (4), ATC (2), Crew (1), Being Lost (1), Traffic (1)] Slip (16) Fatigue (3) Forget (2)	Denial (2) Don't Know Policy (1)	Slip (13) Denial (10) Forget (6) Distracted (3) Fatigue (2) Complacency (2)	Distracted (8) Expectations Fail (4) Forget (3) Accommodating Others (2) Denial (2) Fatigue (1)
Others	ATC (13) Captain (3) Company (3) [dispatchers (2), maintenance(1)] Crew (2) Traffic (2)	Passengers (35) Captain (6) Security (3) Gate Agent (3) Company (2) FAA (1)	Supervisor (12) Team (8) Company (2) Pilots (2)	Pilots (26) Controllers (13) Supervising Controllers (6)
Pressure & Work Load	Schedule pressure (2) Passenger pressure (1)	Schedule Pressure (2) Rushing (2)	Rushing (4)	Traffic Volume (8) Combined positions/ sections (4) Training Requirements (2)
Equipment	Radio (4) TACSII (4) Autopilot (2) Transponder (2) Tires/Brakes (1) Altimeter (1) Airspeed Indicator (1) Slat and Flaps computer (1) Engine Shutdown (1)	Mechanical Problem (7) Smoke (4) Oxygen Mask (1) Compression Stall (1) Medical Equipment (1) Landing gear (1)	Wrong Tools (3) Lack of Parts (2) Equipment Failure (2) Lighting (1)	Radar fade in and out (7) Radar overlap on screen (2) Transponder (2) Autopilot (1) Weather Equipment (1) Radio (1)
Weather	Ice (1) Wind (1)	Turbulence (7)	0	Wind (1) Thunder Storms (1) Poor Weather (1)
Info Source	Approach Plate (2) VOR (1) NOTAMS (1) ATIS (1) Company Charts (1)	0	Maintenance Manual (6) Job Card (5) FAA (4) Logbook Requirements (4) Engineering Orders (1) Computer Training (1)	Routes (2)
Airport	Taxi-ways (2)	0	0	Taxiways (2) Tower Height (1) View Obstructed by Construction (1) Lights (1)
Total Options	93	79	93	103

Table 2. Taxonomy of "Blame" Options found in 200 ASRS Narratives in Four Work Domains. (n = 50 in each work domain)

DISCUSSION

Overall, 368 blame options were offered within the 200 narratives. Blame options were not evenly distributed across options or within domains. Of interest here is the ways in which types of blame options cited in the narratives vary within and across each of the four domains. In all four domains, self and other blame options taken together accounted for more than half of the options offered but they were not evenly distributed between self and other. For example, in Flight Crew narratives 43% of the blame options (40) were categorized as Self Blame while only 3% (3) of Cabin Crew blame options related to Self. Within Ground Crew narratives 38% (36) indicated Self as a blame option while only 20% (20) of blame options fell into this category for Air Traffic Controllers. Cabin Crew's blame options pointed to Others 63% of the time (50), as compared with 43% (45) in Air Traffic Controllers narratives. Only 25% of

the options utilized in Flight Crew (23) and Ground Crew (24) narratives focused blame on Others. The variation in these options may reflect more than the simple context of work (more or less "others" around to blame) and indicate instead the constraints implied in regulations, polices or even organizational norms (the influence of the semiotic and broader cultural levels on the linguistic production of narratives).

Blame options that did not focus specifically on persons were also semiotic systems carrying specific meaning for participants in aviation domains: workload, weather, equipment, information sources and airports. Workload was most cited by Air Traffic Controllers; 14% of their total blame options (14) pointed to Workload as compared to 3% Flight Crew (3), 5% Cabin Crew (4) and 4% of Ground Crew (4). Equipment (including communication instruments such as transponders and radar) was consistently cited in all domains. Equipment options varied specifically in each domain, accounting for 18% (17) of the blame options in Flight Crew narratives, 19% (15) in Cabin Crew, 8% in Ground Crew (8) and 14% (14) in Air Traffic Controllers. The other notable item in this initial taxonomy was the high percentage of blame option citations found in Ground Crew narratives for Information Sources 23% (21), compared to only 5% in Flight Crew (6), 0% in Cabin Crew, and 1% (2) in Air Traffic Controllers.

This initial taxonomy demonstrates that blame options fall within 7 broad categories but that usage of these options varies within and across work domains. Self Blame may be accepted or denied. In addition, these narrators suggest that blame may be located in multiple categories per incident

SUMMARY

In this study we have demonstrated a communicational approach to the concept of blame, seeking not to locate singular causes for incidents but to examine the ways in which blame options are perceived in different work domains within aviation. Blame serves the aviation industry and the elaboration of a safety culture by indicating overlapping and unique issues of concern to participants within differing domains. By further elaborating these taxonomies, noting domain differences, and tracking shifts in blame option usage we hope to identify issues requiring the attention of managers, designers, trainers and researchers. The taxonomies further refined provide the groundwork for larger scale textual analysis of ASRS incident reports, utilizing software such as QUORUM (McGreevy, 1997). A QUORUM network model of the text examines contextual

relatedness yielding an image of the shape of a text, the relatedness of objects, actions, and attributes, while it gives insight into context. This provides output in the form of global modeling and relevance-ranking of text that allow for an examination of blame options within and across domains of work. In addition, we hope to contribute to the concept of the safety culture by proposing a communicational approach to the analysis of additional organizational texts that give insight into current and proposed understandings of the concept of safety.

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